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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/470,236	11/15/1999	ANDREW D. BAILEY III	LAMIP123/P05	5922

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EXAMINER  
ALEJANDRO MULERO, LUZ L

ART UNIT PAPER NUMBER  
1763

DATE MAILED: 01/04/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/470,236

Applicant(s)

BAILEY ET AL.

Examiner

Luz L. Alejandro

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 28 August 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-37 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 8.

- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## **DETAILED ACTION**

### ***Continued Prosecution Application***

The request filed on 8-9-01 for a Continued Prosecution Application (CPA) under 37 CFR 1.53(d) based on parent Application No. 09/470,236 is acceptable and a CPA has been established. An action on the CPA follows.

### ***Specification***

The disclosure is objected to because of the following informalities: under "Cross Reference to Related Cases"; the attorney docket numbers should be deleted and the patent application numbers should be inserted.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

Claims 1-37 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Once a limitation is introduced in a claim sequence subsequent use of that limitation must use either -- the -- or -- said --, or be appropriately differentiated to represent a different limitation, note the term "one peripheral region" in lines 10-11 of claim 1.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3 and 5-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Ishii et al., U.S. Patent 5,571,366.

Ishii et al. shows the invention as claimed including a cylindrical processing chamber (see column 4, lines 15-17) used to process a substrate, said cylindrical chamber including a top region and a peripheral region; a gas flow system (controller) 37 which is used to control the input gas lines which are in the lower peripheral portion of the substrate (see gas source 15 in Figure 1 where the gas is directed into opposing peripheral sides of the wafer chuck) and the gas flow lines which are in the gas supply means 20 (for description of the apparatus of Figure 1 see column 4, line 15 – column 6, line 62).

Claims 1-5, 7-8, and 12-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Suzuki et al., U.S. Patent 5,522,934.

Suzuki et al. shows the invention as claimed including a cylindrical plasma processing chamber (see column 4, lines 8-11) used to process a substrate, said plasma processing chamber including a top central region and a peripheral region; a gas flow system (34, 38, 40) coupled to said plasma processing chamber, said gas flow

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system controlling flow of input gas into at least two different regions, for instance, a top central region 36A, an upper peripheral region 36B, and a lower peripheral region 34C near the substrate, wherein the flow system controls the amount or volume and flow rate of the input gas (see Figures 1-2 and column 3, line 58 – column 6, line 9).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishii et al., U.S. Patent 5,571,366 in view of Singh et al., U.S. Patent 6,042,687.

Ishii et al. is applied as above but lacks anticipation of a gas ring structure supplying the input gas to a peripheral region of the chamber. Singh et al. discloses that gas rings are conventionally used to provide a more uniform distribution of gas (see column 1, lines 34-47). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Ishii et al. to include a gas ring in the lower peripheral portion in order to provide for a more even gas distribution.

Claims 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al., U.S. Patent 5,522,934 in view of Li et al., U.S. Patent 6,009,830 or Ishii et al., U.S. Patent 5,571,366.

Suzuki et al. is applied as above but lacks anticipation of the gas flow system receiving a gas flow control signal for determining the amount or volume of the input gas that is delivered into the plasma processing chamber by each one of the first and second gas outlets. Li et al. discloses a controller 76 that is computer based and is used to control the gas flow and flow rates of the various inlets to the processing chamber (see Figure 2 and column 5, lines 4-19). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the controller of Li et al. in the primary reference of Suzuki et al. because this would provide for an automated control process. Furthermore, Ishii et al. discloses a gas flow system (controller) 37 which is used to control the input gas lines which are in the lower peripheral portion of the substrate (see gas source 15 in Figure 1 where the

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gas is directed into opposing peripheral sides of the wafer chuck) and the gas flow lines which are in the gas supply means 20 (for description of the apparatus of Figure 1 see column 4, line 15 – column 6, line 62). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the controller of Ishii et al. in the primary reference of Suzuki et al. because this would provide for an automated process.

Claims 1-5, 7-9, and 12-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al., U.S. Patent 6,009,830 in view of Suzuki et al., U.S. Patent 5,522,934.

Li et al. shows the invention substantially as claimed including a processing chamber 8 including a top region 20 and a peripheral region 30, the peripheral region not including any points of said top region; a gas flow system 76 coupled to said processing chamber, said gas flow system 76 controlling flow of said input gas into at least two regions of said chamber (see column 5, lines 4-19); one region being a top central region and the other region being a lower peripheral region (see Figure 2); the gas flow system also including at least one gas inlet for receiving the input gas that is to be delivered into said plasma processing chamber 8 and at least first and second gas outlets, for example, 38 and 40 in Figure 2, that are each capable of delivering the input gas to the plasma processing system, whereby the outlets are used to deliver the gas to the processing chamber (see column 3, lines 11-58, column 4, lines 10-24, and column 5, lines 4-19).

Li et al. lacks anticipation of a cylindrical processing chamber and an input gas opening in an upper peripheral region. Suzuki et al. discloses a cylindrical plasma processing chamber (see column 4, lines 8-11) and also discloses gas openings in a multitude of regions including upper peripheral regions, for instance, designated by reference number 44 (see Figure 2 and column 6, lines 19-21). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Li et al. so as to have a cylindrical processing chamber and an additional gas opening in an upper peripheral region as disclosed by Suzuki et al. because this will allow for more uniform gas concentrations during processing (see column 2, lines 15-26).

Claims 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al., U.S. Patent 6,009,830 in view of Suzuki et al., U.S. Patent 5,522,934 as applied to claims 1-5, 7-9, and 12-18 above, and further in view of Singh et al., U.S. Patent 6,042,687.

Li et al. and Suzuki et al. are applied as above but lack anticipation of a gas ring structure supplying the input gas to a peripheral region of the chamber. Singh et al. discloses that gas rings are conventionally used to provide a more uniform distribution of gas (see column 1, lines 34-47). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Li et al. to include a gas ring in the peripheral portion in order to provide for a more even gas distribution.



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Claims 19-20, 25-29, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ueda et al., U.S. Patent 5,810,932 in view of Kadomura, U.S. Patent 6,096,160 and further in view of Moslehi et al., U.S. Patent 5,976,261.

The rejection is maintained as stated in paper #5 mailed 9-26-00 for the reasons of record. In response to the challenge of official notice, Singh et al. shows the use of gas rings in conventional plasma apparatus (see column 1, lines 34-45).

Claims 19-20, 25-27, 30-32 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ueda et al., U.S. Patent 5,810,932 in view of Kadomura U.S. Patent 6,096,160 and further in view of Hartig et al., U.S. Patent 5,683,548.

The rejection is maintained as stated in paper #5 mailed 9-26-00 for the reasons of record.

Claims 19-27 and 30-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ueda et al., U.S. Patent 5,810,932 in view of Kadomura U.S. Patent 6,096,160 and further in view of Ishii et al., U.S. Patent 5,571,366.

The rejection is maintained as stated in paper #5 mailed 9-26-00 for the reasons of record.

Claims 28-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ueda et al., U.S. Patent 5,810,932 in view of Kadomura U.S. Patent 6,096,160 and

further in view of Li U.S. Patent 6,009,830 or Hartig U.S. Patent 5,683,548 or Ishii et al., U.S. Patent 5,571,366 and Singh et al., U.S. Patent 6,042,687.

The rejection is maintained as stated in paper #5 mailed 9-26-00 for the reasons of record. Further, in response to the challenge of the official notice taken in the previous office action, Singh et al. discloses that gas rings are conventionally used to provide a more uniform distribution of gas (see column 1, lines 34-47). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Ueda et al., Kadomura and Li or Hartig or Ishii et al., to include a gas ring in the lower peripheral portion in order to provide for a more even gas distribution.

### ***Response to Arguments***

Applicant's arguments with respect to claims 1-18 have been considered but are moot in view of the new ground(s) of rejection. Since applicant has not amended claim 19 the same way as claim 1 has been amended, the previous rejections made in the final office action mailed 4-10-01 are maintained.


### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luz L. Alejandro whose telephone number is 305-4545. The examiner can normally be reached on Monday-Thursday from 8:30-6:00 and alternate Fridays.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills, can be reached on 308-1633. The fax phone numbers for the organization where this application or proceeding is assigned are 872-9310 for regular communications and 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 308-0661.

  
Luz L. Alejandro  
Patent Examiner  
Art Unit 1763

December 2, 2001